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Pilot Control Design Influences on Pilot Monitoring Effectiveness of Crew Resource Management in Airbus 320 Landings

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Triggering Mechanisms as Barriers to PM Effectiveness

Disclaimer

- My research, ideas, opinions, and thoughts are my own.
- I am not here as a representative of my employer or any other entity.

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Presentation Objectives

- Describe Pilot Monitoring Barriers
  - Flight Deck Automation
  - Pilot Flight Control Design
  - CRM Breakdowns
- Describe *Transition State*
  - Triggering Mechanisms
  - Known hazards transition to risk

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Pilot Monitoring Duties

- FAA AC-12—71B, SOP's and PM Duties for Flight Deck Crewmembers
  - PM Duties
    - Monitors flight path and energy state
    - Supports PF
    - Monitors aircraft state and system status
    - Calls out perceived deviations
    - Prepared to intervene, if necessary

Barriers to PM Effectiveness

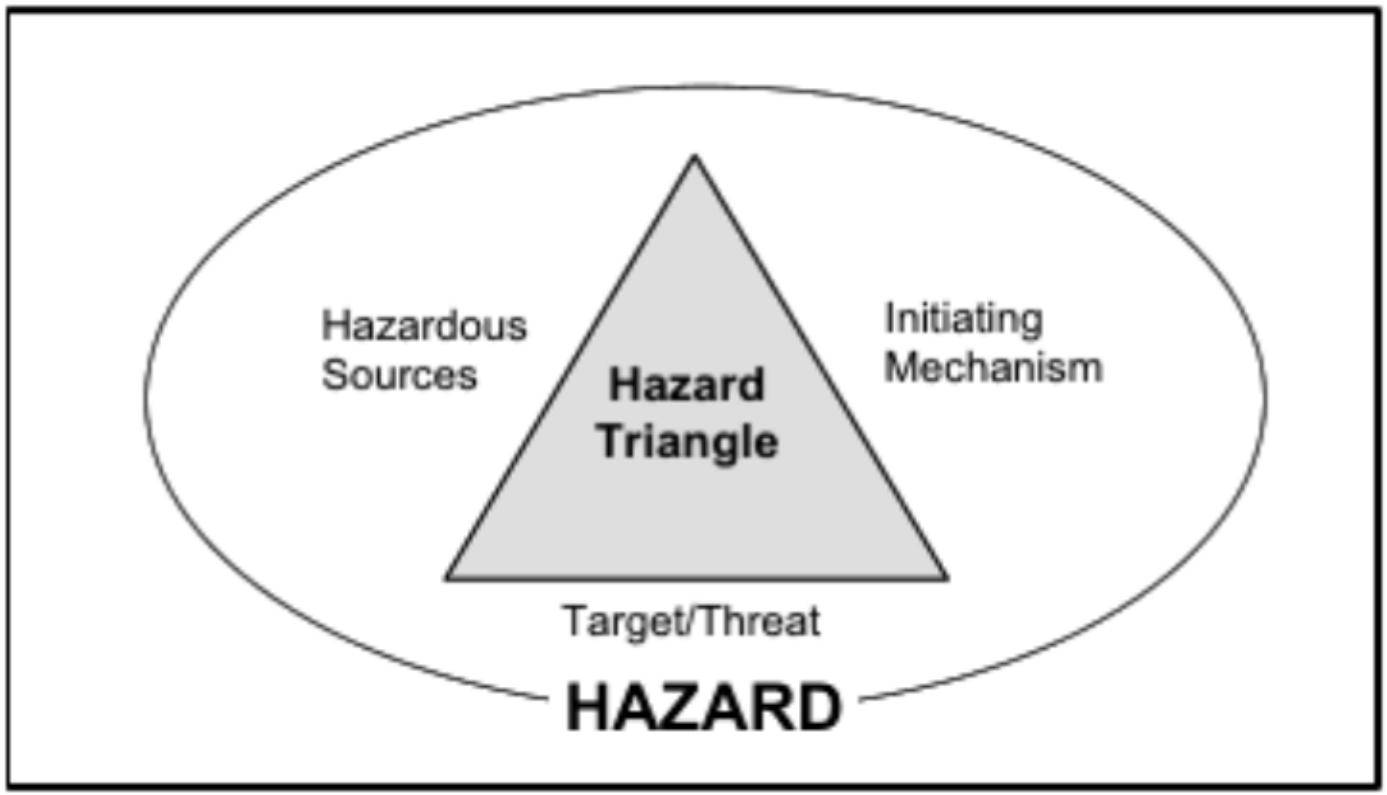
- Time Pressure, high workload
- Lack of feedback, lapses in attention span
- Design of SOP
- Pilots' Inadequate Mental Model of Automation Modes
- Training
- Loss of Situational Awareness

State Transition

- Event(s) that changes hazard to a mishap
  - Hazard components
    - Source-rudimentary element
    - Initiating mechanism-causal factor(s)
      - Transforms hazard (latent failure) into a mishap
      - Initiating mechanism-causal factor(s)
    - Hazard target and threat
      - Target is the vulnerable entity
      - Threat is the level of risk associated with the target (Ericson, 2005).

The Hazard Triangle

Ericson (2005)



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Safety Risk Mitigation

- Job and Task Analysis
- Evaluate Hazard Triangle Components
- Past Events and Lessons Learned
- Review Safety Criteria, Regulatory Requirements, and Current Safety Practices
- Ericson, C.A. (2005) *Hazard analysis techniques for system safety.* Hoboken, NJ: John Wiley and Sons.

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GAP Analysis

- Actual-Where We are.
- Optimal-Where we want to be.

❑ Four Gap Types

- Performance Gap
- Perceptual Gap
- Design Gap
- Organizational Gap

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System Design

- Components of System Safety
  - Training
  - Equipment
  - Procedures

Questions?

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